

# BULLETIN

## OF THE INSTITUTE OF METALS

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VOLUME 2

NOVEMBER 1953

PART 3

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### INSTITUTE NEWS

#### Autumn Meeting in Southport

The Autumn Meeting of the Institute took place in Southport from 21 to 25 September, and was attended by about 400 members and ladies. The Autumn Lecture on "The

Town Hall in the evening. A banquet was given by the Local Reception Committee on 23 September, at which the speakers were the Mayor, Sir Harry Pilkington, the President



[Courtesy : Sheet Metal Industries.

The Mayor and Mayoress of Southport and the President and Mrs. Thompson Receiving Guests at the Civic Reception at Southport.

New Metal Titanium", delivered by Dr. Maurice Cook on the evening of 21 September, is reprinted in the present issue of the *Journal* (p. 93).

At the opening session on the morning of 22 September, members were welcomed by the Mayor of Southport (Alderman William Tattersall), who also gave a reception at the

(Professor F. C. Thompson), and Senior Vice-President (Dr. S. F. Dorey).

Many members took part in an excellent programme of works visits that had been arranged, and there was an interesting series of visits for the ladies. The meeting ended with an all-day coach tour to North Wales.

## PERSONAL NOTES

### Informal Discussion on "The Training of Metallurgists for Industry", London, Friday, 27 November 1953.

Members are reminded that an Informal Discussion on "The Training of Metallurgists for Industry", arranged by the Institute of Metals and the Institution of Metallurgists, will take place in the Lecture Theatre of The Royal Institution, Albemarle Street, London, W.1, on Friday, 27 November 1953, from 10.30 a.m. to 12.45 p.m. and from 2.15 to 4.30 p.m.

The discussion will *not* now be mainly devoted to different aspects of the subject at each of the two sessions, but will cover the whole subject at both sessions. Invitations to be present at this meeting have been issued to the members of scientific and technical societies who may be interested. Visitors will be welcome and no cards of admission are required.

It is very much hoped that the meeting will be well attended and that full advantage will be taken of this opportunity for the exchange of ideas and experience, on a subject which is of very wide interest.

### "On the Phases Occurring in Alloys of Aluminium with Copper, Magnesium, Manganese, Iron, and Silicon."

Members are reminded that copies of this important paper by the late Professor Phragmén, which appeared in the *Journal* in 1950, are still available, price 5s., post free. The paper gives a very valuable survey of the constitution of binary, ternary, quaternary, and quinary alloys of aluminium, and is illustrated with numerous diagrams and photomicrographs. There is also a table giving the etching properties of the phases encountered.

## PERSONAL NOTES

MR. A. J. ANDERSON has been appointed Works Manager of the Wolverhampton Metal Company (Australia) Pty., Ltd., Sydney.

MR. H. B. BELL is now Lecturer in Metallurgy at the Royal Technical College, Glasgow.

MR. W. V. BINSTEAD has resigned his post as Welding and Joining Engineer in the Sales Development Division of the Northern Aluminium Co., Ltd., to take up a similar appointment with the Saturn Oxygen Group of Companies, Roehampton Lane, London, S.W.15. He will be concerned with the whole field of light alloy joining.

DR. MAURICE COOK has succeeded Mr. H. E. Jackson on the Council of the Aluminium Development Association.

M. A. DERUYTTERE, having completed two years' research in the Metallurgy Department at Sheffield University, has returned to Belgium to take up an appointment as an Assistant Lecturer at the Institut de Métallurgie, Louvain.

MR. A. E. EL MEHAIRY has been awarded the Ph.D. degree of London University in the Faculty of Engineering (Metallurgy).

DR. JOHN A. FELLOWS has left the American Brakeshoe Company and is now Chief Staff Metallurgist to the Mallinckrodt Chemical Works, St. Louis, Mo., U.S.A.

COLONEL SIR PAUL GUETERBOCK, Past-President, who was taken seriously ill in London in September and admitted to Guy's Hospital, is now making a good recovery.

MR. T. HEWITT has returned to England from Egypt.

MR. W. R. HIBBARD has retired from the American Brass Company after 25 years' service in its Technical Department. He intends to set up a consulting practice at his home, 37 Euclid Avenue, Waterbury 10, Conn., U.S.A.

MR. L. G. HOLT has been awarded the Ph.D. degree of the University of Wales, and has left the National Smelting Co., Ltd., to take up an appointment as a Senior Investigator with the South Wales Aluminium Co., Ltd., Resolven, Glam.

DR. J. E. HUGHES has left Imperial College, London, and is now a Research Metallurgist at the A.E.I. Research Laboratories, Aldermaston.

DR. N. P. INGLIS has succeeded Dr. Maurice Cook on the Executive Committee of the Aluminium Development Association.

DR. P. H. JENNINGS has taken up an appointment as Assistant at the County Technical College, Wednesbury.

MR. PAUL W. JONES has relinquished his appointment at the County Technical College, Wednesbury, to become a Research Investigator at the British Welding Research Association.

MR. D. S. MCGREGOR has been appointed Head of the Department of Mechanical Engineering, College of Technology, Leicester.

MR. M. MCINTYRE is now Lecturer in Metallurgy at Derby Technical College.

DR. R. MADDIN of the School of Engineering, The Johns Hopkins University, Baltimore, Md., U.S.A., is to spend 1954 as Visiting Lecturer in Metallurgy at the University of Birmingham.

PROFESSOR GEORG MASING has been elected an Honorary Member of the Deutsche Gesellschaft für Metallkunde.

MR. J. J. PICK has been awarded the Ph.D. degree of Birmingham University and now holds the position of Joseph Lucas Research Fellow in the Industrial Metallurgy Department.

MR. I. J. POLMEAR has returned to the Aeronautical Research Laboratories, Melbourne, after spending two years at the Fulmer Research Institute.

MR. W. S. TURPIN has left Grey and Marten, Ltd., to take up an appointment with Hepworth and Grandage, Ltd., Bradford.

MR. P. B. A. WILLIS has left University College, Cardiff and is now Research Metallurgist with William Jessop and Sons, Ltd., Sheffield.

### Deaths

The Editor regrets to announce the deaths of:

DR. FRANZ HORSTER, Director of Vereinigte Deutsche Metallwerke A.G., Altena, Westphalia, on 15 September.

DR. O. F. HUDSON, A.R.C.S., on 8 October. He was an Original Member of the Institute.

MR. WILLIAM SINGLETON, Joint Managing Director, British Lead Mills, Ltd., on 11 September.

## LETTER TO THE EDITOR

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### "Whisker" Growths on Copper

I have been interested in the recent correspondence on this subject, and particularly in the report by Mr. Gollop of the occurrence of such growths during electrodeposition (*Bulletin*, 1953, 2, 7).

I have experienced a similar phenomenon in large copper electroforming baths, in which "whiskers" or "spikes" started to grow from the cathode surfaces. This occurred

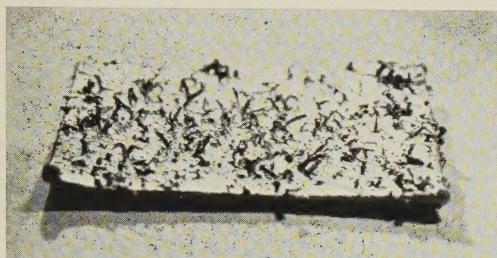


FIG. 1.—Typical Spiky Deposit.  $\times \frac{1}{2}$ .

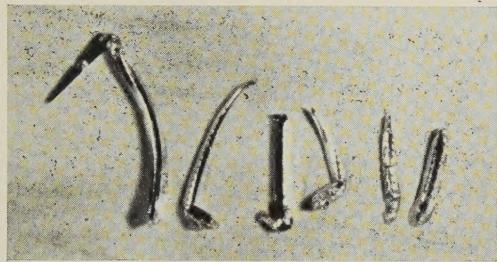


FIG. 2.—Typical Spikes Removed from Plate.  $\times 2$ .

during the last war at a period when the mains water was heavily chlorinated after air raids. These growths were found to be associated with excess chlorine in the water, but laboratory tests later showed that the presence of chloride ions in the form of sodium chloride, magnesium chloride, or as hydrochloric acid in excess of 0.5 grains/gal. expressed as sodium chloride, produced the same effect.

Figs. 1 and 2 show the typical appearance of such growths. Normal deposits were obtained after treating the solutions with silver nitrate and filtering. No further work has been done on this subject, but it is probable that other impurities may have a similar effect to that of chlorides.

J. G. M. TURNBULL

C. A. Parsons and Co., Ltd.,  
Newcastle upon Tyne 6.

## OBITUARY

### Mr. W. J. Terry

William Joseph Terry died at Littlestone-on-Sea on 27 July 1953.

He was born in London, and in 1898 joined The British Thomson-Houston Co., Ltd. After serving with that Company in the Accounts Department and as Supervisor of Purchases, he left them in 1918 to join The London Electric Wire Company and Smiths, Ltd., as Secretary and Manager,

being appointed to the Board in 1920. He also became a Director of The Liverpool Electric Cable Co., Ltd., when a controlling interest was acquired in 1920, and of Vactite Wire Co., Ltd. when that Company was taken over in 1934.

In 1928 he became a Joint Managing Director of The London Electric Wire Company and Smiths, Ltd., Deputy Chairman in the following year, and Chairman in March 1931.

Mr. Terry took the widest interest in the industries with which he was associated. He was Chairman of The Cable Makers Association for the three years 1943–45 and of The High-Conductivity Copper Association for the years 1951–52 and 1952–53. He was actively concerned in the conception and formation of The British Non-Ferrous Metals Federation, of which he was a Vice-President from the beginning until 1951, when he was elected President for the year 1951–52.

In addition to the foregoing, Mr. Terry served on many committees dealing with matters affecting the electrical and non-ferrous metals industries.

He was intrinsically kindly, and possessed of a magnetic and vital personality, which together with his courage and fair-mindedness made him greatly beloved and widely respected by everyone with whom he came in contact.

ERIC L. WILDY.

## JOINT ACTIVITIES

### Beilby Memorial Awards

From the interest derived from the invested capital of the Sir George Beilby Memorial Fund, at intervals to be determined by the Administrators representing the Royal Institute of Chemistry, the Society of Chemical Industry, and the Institute of Metals, awards are made to British investigators in science to mark appreciation of records of distinguished work. Preference is given to investigations relating to the special interests of Sir George Beilby, including problems connected with fuel economy, chemical engineering, and metallurgy, and awards are made, not on the result of any competition, but in recognition of continuous work of exceptional merit, bearing evidence of distinct advancement in science and practice.

In general, awards are not applicable to workers of established repute, but are granted as an encouragement to younger men who have done original independent work of exceptional merit over a period of years.

The Administrators are empowered to make more than one award in a given year if work of sufficient merit by several candidates is brought to their notice. For 1952, one award of one hundred and fifty guineas was made to Mr. T. V. Arden.

Consideration will be given to the making of an award or awards from the Fund early in 1954. Outstanding work of the nature indicated may be brought to the notice of the Administrators, either by persons who desire to recommend the candidate or by the candidate himself, *not later than 31 December 1953*, by letter addressed to the Convener of the Administrators, Sir George Beilby Memorial Fund, Royal Institute of Chemistry, 30 Russell Square, London, W.C.1.

The letter should be accompanied by *nine copies* of a short statement on the candidate's career (date of birth; education and experience, degrees and other qualifications, special awards, &c., with dates) and of a list of references to papers or other works published by the candidate, independently or jointly.

## OTHER NEWS

## International Union of Crystallography

As already announced, the Third General Assembly and International Congress of the Union will be held in Paris from 21 to 28 July 1954. Full details of the meeting are now available in the First Circular, copies of which may be obtained from the General Secretary of the Union (R. C. Evans, Crystallographic Laboratory, Cavendish Laboratory, Cambridge, England), from the Secretary of the Programme Committee (A. J. Rose, Laboratoire de Minéralogie, 1 rue Victor Cousin, Paris 5, France) or from any of the following regional representatives of the Programme Committee: G. Menzer (Universitätsinstitut für Kristallographie und Mineralogie, Luisenstrasse 37/II, München 2, Germany), W. H. Taylor (Crystallographic Laboratory, Cavendish Laboratory, Cambridge, England), J. D. H. Donnay (The Johns Hopkins University, Baltimore, Md., U.S.A.).

At the Congress, papers will be presented on all aspects of crystallographic research; there will also be an exhibition of crystallographic apparatus and books. After the Congress, two specialized Symposia will be held on "The Location and Function of Hydrogen" and "The Mechanism of Phase Transitions in Crystals", and there will be visits to localities of mineralogical interest. Offers of papers for the Congress and Symposia and notice of enrolment must reach the Secretary of the Programme Committee (preferably on the form accompanying the First Circular) by 15 February 1954. All general correspondence should also be addressed to the Secretary of the Programme Committee.

## DIARY

## The Institute

- 27 November. Informal Discussion on "The Training of Metallurgists for Industry". (Royal Institution, Albemarle Street, London, W.1, at 10.30 a.m. and 2.15 p.m.)
- 3 December. "Metallurgical Trends of Interest to the Chemical Industry", by L. Rotherham (Joint Meeting with the Bristol Section of the Society of Chemical Industry and the Chemical Engineering Group.) (Department of Chemistry, The University, Woodland Road, Bristol 8, at 7.0 p.m.)

## Local Sections and Associated Societies

- 3 November. Oxford Local Section. "Metal Economics", by D. A. Oliver. (The Oak Room, Cadena Café, Cornmarket Street, Oxford, at 7.0 p.m.)
- 3 November. Sheffield Local Section. "The W. 1400 Walking Dragline". (Joint Meeting with the Sheffield Metallurgical Association and the Sheffield Society of Engineers and Metallurgists.) (British Iron and Steel Research Association, Hoyle Street, Sheffield, at 7.0 p.m.)
- 3 November. South Wales Local Section. "The Search for Metalliferous Mineral Deposits", by Dr. David Williams. (University College, Metallurgy Department, Singleton Park, Swansea, at 6.45 p.m.)

- 5 November. Birmingham Local Section. Discussion on "Metals or Plastics". (James Watt Memorial Institute, Great Charles Street, Birmingham 3, at 6.30 p.m.)
- 5 November. London Local Section. "The Preparation and Properties of High-Purity Nickel Powder", by Professor F. A. Forward. (The Royal School of Mines, South Kensington, London, S.W.7, at 7.0 p.m.)
- 9 November. Scottish Local Section. "Gas Unsoundness", by Dr. C. E. Ransley. (Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)
- 10 November. Liverpool Metallurgical Society. "The Development of Metallic Arc Welding and Electrodes During the Past Half-Century", by E. Flintham. (Joint Meeting with the Institute of Welding.) (College of Technology, Byrom Street, Liverpool, at 7.15 p.m.)
- 11 November. Manchester Metallurgical Society. "The Properties and Applications of Spheroidal Graphite Cast Iron", by Dr. A. B. Everest. (Lecture Room, The Central Library, Manchester, at 6.30 p.m.)
- 12 November. Leeds Metallurgical Society. "Zinc-Base Die-Casting Alloys", by L. A. J. Lodder. (Chemistry Department, The University, Leeds 2, at 7.15 p.m.)
- 16 November. Sheffield Local Section. "Indentation Hardness", by Dr. D. Tabor. (Joint meeting with the Sheffield Metallurgical Association and the Sheffield Society of Engineers and Metallurgists.) (Mappin Hall, St. George's Square, Sheffield, at 7.30 p.m.)
- 19 November. Birmingham Local Section. "Recent Advances in Electrodeposition", by Dr. J. W. Cuthbertson. (The Imperial Hotel, Temple Street, Birmingham, at 6.30 p.m.)
- 19 November. Liverpool Metallurgical Society. "Metallurgical Problems Connected with the Development of Atomic Energy", by L. Rotherham. (Liverpool Engineering Society, The Temple, Dale Street, Liverpool, at 7.0 p.m.)
- 19 November. North East Metallurgical Society. Discussion on "The Training of a Metallurgist". Opening speaker: Dr. A. D. Merriman. (Cleveland Scientific and Technical Institution, Middlesbrough, at 7.15 p.m.)
- 25 November. Manchester Metallurgical Society. "Sub-Grain Structures in Metals", by Dr. R. W. Cahn. (Lecture Room, The Central Library, Manchester, at 6.30 p.m.)
- 1 December. Oxford Local Section. "Welding", by Dr. W. I. Pumphrey. (The Oak Room, Cadena Café, Cornmarket Street, Oxford, at 7.0 p.m.)
- 1 December. South Wales Local Section. "Metallurgical Research in the Electrical Industry", by Dr. Ivor Jenkins. (University College, Metallurgy Department, Singleton Park, Swansea, at 6.45 p.m.)
- 2 December. London Local Section. "Bell Foundry", by H. Howard. (Joint Meeting with the London Branch, Institute of British Foundrymen.) (Waldorf Hotel, Aldwych, London, W.C.2, at 7.30 p.m.)
- 3 December. Birmingham Local Section. Students' evening. (James Watt Memorial Institute, Great Charles Street, Birmingham 3, at 6.30 p.m.)
- 3 December. Leeds Metallurgical Society. "Some Modern Copper-Base Alloys", by Dr. E. Voce. (Chemistry Department, The University, Leeds 2, at 7.15 p.m.)

## DIARY

### Other Societies

- 5 November. East Midlands Metallurgical Society.** "The Training of Metallurgists", by Dr. A. D. Merriam. (Nottingham and District Technical College, Shakespeare Street, Nottingham, at 7.30 p.m.)
- 7 November. Institute of British Foundrymen, Wales and Monmouth Branch.** "Aluminium Pattern Equipment by the Pressure-Cast Plaster Process", by D. H. Potts. (Engineers' Institute, Park Place, Cardiff, at 6.0 p.m.)
- 7 November. Institute of British Foundrymen, West Riding of Yorks. Branch.** "Shell Moulding", by C. Potter. (Technical College, Bradford, at 7.30 p.m.)
- 11 November. Institute of British Foundrymen, London Branch.** "Pattern-Making and Storage", by A. Talbot. (Waldorf Hotel, London, W.C.2, at 7.30 p.m.)
- 11 November. Institution of Production Engineers, Southern Section.** "Practical Application of Tungsten", by F. H. Bates. (The Municipal College Annexe, Portsmouth, at 7.0 p.m.)
- 12 November. Institute of British Foundrymen, Lincolnshire Branch.** "Quantity Production of Engineering Castings", by J. Burrell. (Lincoln Technical College, at 7.15 p.m.)
- 12 November. Institute of Welding, South London Branch.** Film Meeting, including latest films on "Welding of Nickel Alloys and the Aircomatic Process". (2 Savoy Hill, London, W.C.2, at 6.30 p.m.)
- 13 November. Society of Chemical Industry, Corrosion Group.** Symposium on "Cathodic Protection". (Institution of Electrical Engineers, London, W.C.2, at 9.45 a.m.)
- 14 November. Institute of British Foundrymen, Newcastle Branch.** "Outlook and Attitude of Management and Works of British and American Foundries", by R. F. Horton. (Neville Hall, Westgate Road, Newcastle-on-Tyne, at 6.0 p.m.)
- 14 November. Institute of British Foundrymen, Scottish Branch.** "Rationalized Foundry Management", by F. Buckley. (Royal Technical College, Glasgow, at 3.0 p.m.)
- 17 November. Institute of British Foundrymen, East Anglian Section.** "Sands", by A. P. Lovat. (Central Hall, Public Library, Ipswich, at 7.30 p.m.)
- 19 November. Institution of Mining and Metallurgy.** General Meeting. (The Geological Society, Burlington House, London, W.1, at 5.0 p.m.)
- 19 November. Institution of Production Engineers, Glasgow Section.** "Metal Finishing and Hard Coating", by S. A. J. Murray. (The Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent, Glasgow, C.2, at 7.30 p.m.)
- 19 November. Society of Chemical Industry, Aberdeen and North of Scotland Section.** Joint meeting with Chemical Society and the Royal Institute of Chemistry. "The Production, Fabrication and Properties of Titanium", by Dr. N. P. Inglis. (Dundee, at 7.30 p.m.)
- 20 November. Society of Chemical Industry, Aberdeen and North of Scotland Section.** Joint meeting with Chemical Society and the Royal Institute of Chemistry. "The Production, Fabrication, and Properties of Titanium", by Dr. N. P. Inglis. (Robert Gordon's Technical College, Aberdeen, at 7.30 p.m.)
- 23 November. Institution of Production Engineers, Derby Section.** "Difficulties and Developments in Deep Drawing and Pressing", by Dr. J. D. Jevons. (The College of Art, Green Lane, Derby, at 7.0 p.m.)
- 25 November. Institute of British Foundrymen, Birmingham Branch.** "Shell Moulding", by J. E. Worthington. (James Watt Memorial Institute, Great Charles Street, Birmingham 3, at 7.15 p.m.)
- 25 November. Institution of Production Engineers, Western Section.** "The Protection of Metal Components against Atmospheric Corrosion", by N. R. Laban. (The Grand Hotel, Broad Street, Bristol 1, at 7.15 p.m.)
- 25 November. Society of Chemical Industry, South Wales Section.** Afternoon visit to the Electrolytic Tinning Plant of Messrs. Richard Thomas & Baldwins, Ebbw Vale, Mon., followed by "Metal Containers for Food", by J. G. Huntley. (Joint meeting with the Food Group and with the Bristol and South Wales Section of the Royal Institute of Chemistry.) (The Technical College, Newport, at 7 p.m.)
- 26 November. Institution of Production Engineers, Lincoln Section.** "Foundry Techniques in Relation to Engineering Production", by G. R. Shotton. (The Ballroom, Ruston Club, Unity Square, Lincoln, at 7.30 p.m.)
- 26 November. Institution of Production Engineers, London Section.** "Recent Developments in Powder Metallurgy", by G. R. Bell. (The Royal Empire Society, Northumberland Avenue, London, W.C.2, at 7.0 p.m.)
- 2 December. Institution of Production Engineers, Gloucester and District Section.** "The Protection of Metal Components against Atmospheric Corrosion", by N. R. Laban. (The Belle Vue Hotel, Cheltenham, at 7.15 p.m.)
- 3 December. Institute of British Foundrymen, Southampton Section.** Films: "Casting a Cylinder Block" and "Casting of Hiduminium Alloys". (Southampton Technical College, St. Mary Street, Southampton, at 7.0 p.m.)
- 8 December. East Midlands Metallurgical Society.** "Powder Metallurgy", by Dr. L. Harrison. (Nottingham and District Technical College, Shakespeare Street, Nottingham, at 7.30 p.m.)
- 9 December. Society of Chemical Industry, Corrosion Group.** "Electrical Measurements in the Study of Paint Coatings on Metal", by D. M. Brasher, A. H. Kingsbury, and F. Wormwell; and "Mechanism of Protection by Paints, with Special Reference to the Action of Basic Pigments", by J. E. O. Mayne and D. van Rooyen. (Joint Meeting with the Oil and Colour Chemists Association.) (Chemical Society, Burlington House, Piccadilly, London, W.1, at 6.30 p.m.)

### APPOINTMENTS VACANT

*Announcements for this column should be addressed to the Editor and not to the Advertisement Department.*

**ASSISTANT METALLURGIST** required. Must be at least A.I.M. Standard. Aptitude for literature surveys and ability to write on technical matters specially desirable. Apply stating age, with details of training and experience, to the Secretary, Copper Development Association, Kendals Hall, Radlett, Herts.

## APPOINTMENTS VACANT

**CHEMIST** required by Ministry of Supply at Port Harcourt, Nigeria, to study effects of tropical conditions on Service materials and equipment. Qualifications: 1st or 2nd class honours degree or equivalent in Chemistry. Post-graduate research experience, particularly concerning study of corrosion, required. Appointment initial tour of 18 months; further tour may be arranged by mutual agreement. Consideration will be given for further employment in U.K. at end of service in W. Africa. Salary: within range, Senior Scientific Officer (min. age 26) £917-£1075. Women somewhat less. Foreign Service Allowance ranging from £170 to £467 also payable, and F.S.S.U. benefits may be available. Free accommodation. Post unestablished. Application forms from M.L.N.S. Technical & Scientific Register (K), 26 King Street, London, S.W.1, quoting F.502/53A. Closing date 14 November 1953.

**GRAVITY FOUNDRY** requires Assistant Manager to specialize in metallurgical control. Applicants should be experienced in metallurgy of light alloys, and supervision of foundry work. Good prospects of promotion in a large and progressive company. Full details of experience to Box No. 355, Institute of Metals, 4 Grosvenor Gardens, London, S.W.1.

**WORKING SUPERVISOR** for 125-KVA. H.F. induction hardening plant for continuous work of highest priority. Metallurgical and electrical knowledge essential. Able to maintain and expand plant. Aldis Bros., Ltd., Sarehole Road, Hall Green, Birmingham.

**YOUNG PHYSICAL METALLURGIST** required by medium-size Company for fundamental research on bearing-material properties. Good facilities for construction of apparatus, assistance on statistical design, and analysis of experiments. Essential qualifications: good grounding in metallurgy, including a degree, and capacity for fundamental thinking. Good prospects of promotion and starting salary offered. Apply: Personnel Manager, The Glacier Metal Co., Ltd., Alperton, Wembley, Middlesex.

### THE UNIVERSITY OF SHEFFIELD

#### *The United Steel Companies' Research Fellowship in Metallurgy*

Applications are invited for the above Fellowship tenable in the Department of Metallurgy of the University of Sheffield.

The object of the Fellowship is to advance knowledge in the field of Ferrous Metallurgy; candidates should already have some research experience, but not necessarily in this field.

Normal tenure will be five years, but the appointment will be for two years in the first instance and thereafter will be renewable annually.

Stipend £750 per annum for the first year, rising by annual increments of £50 to £950 per annum, together with superannuation provision under the Federated Superannuation Scheme for Universities. A higher stipend may be paid to an exceptional candidate.

Applications (*three copies*) including names and addresses of referees and, if desired, copies of testimonials, should reach the undersigned (from whom further particulars may be obtained) not later than 18 November 1953.

A. W. CHAPMAN,  
Registrar.

# THE NON-DESTRUCTIVE TESTING OF METALS

By R. F. HANSTOCK, Ph.D., F.Inst.P.

(Institute of Metals Monograph and Report Series, No. 10)

Cloth, 170 pp., with 72 illustrations

Price 21s. or \$3.50, post free

Each Member of the Institute may purchase one copy at 10s. 6d. or \$2.00, post free

In this specially commissioned monograph, Dr. Hanstock, who is Chief Physicist to High-Duty Alloys, Ltd., has made a comprehensive survey of the various methods that are available for the non-destructive testing of metals, ranging from liquid-penetration methods of crack detection to the use of X-ray diffraction for the determination of grain-size and orientation and for the measurement of internal stresses. Special attention is devoted to damping-capacity measurements as a means of non-destructive testing, a field in which the author himself has worked extensively in recent years.

Throughout, emphasis is laid on the physical bases of the methods described, with specific examples of their

application in many cases. The use of the book is facilitated by an Appendix in which are given in tabular form the properties that may be assessed by non-destructive means, the various methods applicable in each case, and brief comments on their suitability and limitations.

### CONTENTS

Measurement of Thickness; Evaluation of Surface Finish; Detection of Cracks; Radiography; Ultrasonics; Dynamic Tests; Damping-Capacity Measurements; X-ray Diffraction, Electrical and Magnetic Methods; Methods of Analysis.

THE INSTITUTE OF METALS  
4 GROSVENOR GARDENS LONDON, S.W.1